Understanding the Whole of Military Health Systems
The Defence Healthcare Cycle

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The provision of healthcare for military personnel and veterans is an important component of the covenant between the state and its armed forces. While most emphasis is placed on the field medical system, the majority of clinical activity and healthcare costs arise from healthcare in garrisons and for veterans. In this article, Martin Bricknell and Paul Cain propose a high-level concept for a whole-of-military healthcare system that encompasses both operational and non-operational health services – the defence healthcare cycle.

The provision of healthcare for military personnel and veterans is an important component of the covenant between the state and its armed forces. The military medical system may also be a significant part of the government-controlled health economy and may have a significant role in a country’s response to national crises through providing medical support to the armed forces on military operations and providing assistance to the civilian health system. In most states, the military medical system for the armed forces is publicly funded and organised by the ministry of defence. This is normally separate from the public health system for the state’s citizens. This military medical system has two strategic roles: to provide health services for armed forces personnel and other entitled beneficiaries from a fixed network of medical treatment facilities; and to support the armed forces on military operations both within and external to the state. The beneficiaries of this medical system will include armed forces personnel (active duty and reserves) and may also include their families, as well as veterans, retirees, civilians working for the ministry of defence and non-military civilians. This may be a very substantial non-salary benefit of military service. The definition of entitlement that determines access to the military medical system will vary by country; for the purpose of this article this whole group is called the ‘defence patient’.

This article uses ‘defence’ to cover the whole system, ‘armed forces’ to cover the uniformed military services and ‘joint’ to cover integration of the medical services for the navy, army and air force. The term ‘veteran’ is used for an ex-military patient with a long-term medical condition directly attributable to military service and the term ‘retiree’ is used for an ex-military patient who left military service at the end of his or her contract with no attributable health condition. This distinction between the last two terms may be an important policy decision in the allocation of financial responsibilities for the

provision of long-term healthcare for ex-military patients between the military health system and the wider public health system.

This article illustrates the care pathway for defence patients from joining the armed forces as a recruit through garrison-based community health services and care during military operations to hospital and specialist clinical services and finally transition to retiree or veteran. The article examines the unique opportunities for integrating clinical services, clinical and managerial information, and health, welfare and support services for defence patients compared with citizens’ services. It also examines two structural tensions: the first between the numbers and skill-mix required to deliver garrison health services and the requirements to support military operations; and the second between supporting the current force and the duty to provide long-term care for those injured or sick from previous conflict.

In many countries the cost of health services is rising due to improvements in technology and the range of treatments. This is forecast to be unsustainable for current health systems because of the increased longevity of their populations and the lack of sufficient healthcare workers. These challenges equally apply to military medical services with the additional complication of competing against investment in wider military capabilities from the ministry of defence’s budget. Many countries’ armed forces are reorganising their medical services to reduce costs by deepening the symbiosis with the public health system and by shifting from healthcare services which are oriented specifically to navies, armies and air forces to an integrated, joint system. For example, armed forces personnel receive hospital care from the public health system in the UK, Australia and Canada. The US is undertaking a major reorganisation to place all military hospitals under the Defence Health Agency and to reduce

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the number of military medical personnel. It is likely that the organisation and costs of military health services will come under further scrutiny as countries rebalance their defence budgets to adjust to the economic costs of the coronavirus crisis. However, this article does not consider how military health services have contributed to the civil–military response to this crisis.

Military doctrine considers military capabilities as an integration of multiple dimensions. For the UK this is summarised as the Defence Lines of Development under the mnemonic TEPIDOIL (training, equipment, personnel, information, doctrine, organisation, infrastructure, logistics; and for medical subjects – clinical). Many military medical services have mature doctrine for operational medical support, but there is very little published work on doctrine and concepts for non-operational medical support. This article proposes a high-level concept for the design of a complete military healthcare system that encompasses both operational and non-operational health services – the defence healthcare cycle – in order to highlight the inter-relationships between the two systems.

The Defence Healthcare Cycle

The defence healthcare cycle reflects an evolution of thinking as the boundaries between military medical systems and wider public health systems have become more blurred. For the UK, the military health system needed to fundamentally deepen its relationship with the National Health Service (NHS) when independent military hospitals were abolished as part of military reform in the 1990s. This led to the creation of Ministry of Defence Hospital Units that provided military healthcare personnel within NHS hospitals to maintain their clinical competencies and to assist with caring for military patients. Reformulation of concepts for operational health services for the UK armed forces in the past decade has explicitly recognised the role of the NHS in the care of military personnel. The merging of the primary care services of the Royal Navy, the British Army and RAF into the Defence Primary Healthcare created new mechanisms for the commissioning of health services by the NHS for armed forces personnel alongside the unification of the Defence Primary Healthcare workforce across the armed services and civilians. This created the opportunity to further develop the conceptual model for the military health system – the defence healthcare cycle, as shown in Figure 1. Although this will be explained by reference to the UK context, many of these principles are generic and can be extrapolated to any military health system. Indeed, the non-operational elements of many military medical systems are already organised on a joint basis (for example, in Germany, India, Pakistan, Taiwan and Australia). Furthermore, this model explicitly recognises the need to consider how the government meets its obligations towards military personnel who develop long-term health problems as a result of their military service that extend into their post-military life as a veteran or retiree.

The defence healthcare cycle explicitly captures the potential for integration of military and civilian healthcare services to meet the needs of the defence patient and may also highlight opportunities for civilian patients to access the military pathway. While it has components that arise from the individual armed services (the navy, army or air force), it is likely that some healthcare services will be organised to be delivered to all beneficiaries regardless of the originating service. Furthermore, a proportion of the ministry of defence healthcare workforce will be civilian, so the people are ‘defence’ rather than just ‘joint’ (that is, the integration of navy, army and air force).

The design of health systems is increasingly centred on the patient in order to emphasise the need for integration between clinical services and especially to improve care across the boundary.

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Healthcare Roles
Role 1 – Primary healthcare
Role 2 – Resuscitation care
Role 3 – Deployable hospital care
Role 4 – Non-deployable specialist capabilities

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basis. It is likely that this will involve discussion at
government level between the ministries of finance,
defence and health. Subjects for consideration will
include: attribution of costs for military personnel
who require referral into the civilian health system
for clinical services not present in the military health
system; attribution of costs for long-term health
needs resulting from conditions attributable to
military service; attribution of costs for health needs
arising after military service (veterans and retirees),
especially predictable, age-related conditions; and
attribution of costs for non-defence civilians treated
within the military health system for the purpose
of maintaining the skill-mix for military healthcare
professionals.

The defence healthcare cycle shows the whole
system of care for the defence patient across his or
her life course. All defence patients are also citizens
of their parent country and so the civilian public
health system is also part of their health system
(even if only in childhood). Figure 1 is divided into
four components: citizens’ healthcare; firm base
(encompassing garrison healthcare and definitive
healthcare); and the operational patient care pathway
(OPCP). A uniformed member of the armed forces
starts as a civilian in receipt of public healthcare from
the state health system as an entitlement of being a
citizen. Once recruited to the armed forces, they have
access to garrison healthcare based on their place of
work. If deployed, they receive healthcare organised
as the OPCP in Role 1, 2 and 3 medical treatment
facilities, as defined by NATO. The OPCP provides
a unifying model for medical operational capability
and provides a concept for seamless medical care
from point of injury through to evacuation back to
the parent state from overseas. It is already well-
described within UK medical doctrine and the
principles are contained within other national and
NATO military medical doctrines. As such, the
concepts that underpin the OPCP are not considered
further in this article. The skills required of military
healthcare practitioners to meet their role within
the OPCP are heavily skewed towards emergency
medicine, trauma care and infectious diseases, but
these conditions are not routinely part of firm base
healthcare for military patients. Furthermore, the
potential volume of patients during high-intensity
military operations will be substantially more than
the routine demands on the firm base military health
system. Therefore, the competencies required of
healthcare providers to support large-scale military
operations are likely to be very different from the
baseline for the uniformed workforce in the firm
base.

If they are wounded or sick, defence patients who
require medical evacuation from military operations
are received into the Role 4 definitive healthcare
system (primarily hospitals). A small number of
patients may return direct from operations to
garrison healthcare – so called ‘discharge at
airhead’. Armed forces personnel on discharge
from regular service may return to having access to
citizens’ healthcare as a veteran (if they do not have
ill-health conditions that are attributable to military
service) or retiree (if access to military healthcare
services is not part of their retirement benefits).
This is the core, clockwise cycle shown in Figure 1.
It is also possible for a regular service person to be
referred direct from garrison healthcare to definitive
healthcare and to recover; or to be discharged from
the OPCP or definitive healthcare back to garrison
healthcare. These pathways are shown in Figure 1
as two-way arrows. The overall process may be
the same for reserve members of the armed forces,
either as a benefit of reserve service or for the period
of their mobilisation into regular service. There may
be similar or further restrictions on entitlement for
families of armed forces personnel, entitled ministry
of defence civilian employees or civilians.

Firm Base Healthcare

Firm base healthcare covers the two components
of garrison healthcare and definitive healthcare.
‘Firm base’ separates these arrangements from the
mobile and deployable component of the defence
healthcare system that supports the OPCP. Firm
base healthcare is almost invariably a combination
of military-delivered, military-provided (possibly
contracted) and citizen-entitlement services. The
balance varies between states. It is important
that there is oversight of this whole system by the
military leadership to ensure that defence patients
have access to safe, effective and efficient healthcare
in the firm base (both inside the state and possibly
overseas) to meet their clinical needs and the
requirements of their employer.

13. Role 1 is primary healthcare; Role 2 is resuscitation care; and Role 3 is deployable hospital care. See Department of the
Army et al., ‘Joint Health Services’, Chap. 2.
Garrison Healthcare

Garrison healthcare covers the health services delivered within military garrisons (a geographically defined community of military units and supporting organisations). It encompasses the clinical services of primary medical care, dental care, mental healthcare, rehabilitation and occupational health that are embedded within garrisons, similar to arrangements for these services within local communities in the civilian sector. The effect for the defence patient must be integrated across these services to meet their physical and mental health needs. The military health system is primarily an occupational health service and so these clinical services are oriented to the promotion of wellbeing, prevention of ill health and recovery to fitness for role. Furthermore, the uniformed population is primarily young adults who have already been selected as medically fit for military service and so the majority of medical conditions are short-term musculoskeletal or mental health disorders with a very low incidence of serious, long-term health conditions.¹⁵ This requires a garrison health service with a very different skill-mix from civilian health systems. While benefits from the integration of community-based clinical services can apply to civilian as well as military populations, the military healthcare system may have a unique opportunity to exploit this integration through a single organisation that can co-locate services, mandate a common medical information system, and direct clinical leadership and responsibility across professional boundaries. The whole military organisation may also have influence over the wider, social determinants of health. Social health needs may be met by garrison services such as adjustments to employment by the chain of command, welfare services, religious support, military housing, and so on. These services may be provided directly by the ministry of defence using its employees or may be commissioned by other providers, especially for defence patients employed away from military garrisons or overseas. The US TRICARE system is an example of large-scale commissioned healthcare services that provides pre-arranged access to local civilian medical facilities with a global footprint for defence patients.¹⁶

Definitive Healthcare

Definitive healthcare is primarily provided by hospital services. Defence patients may be referred to military hospitals, contracted clinical services or the public health system on the basis of their entitlement as a citizen. Many states’ ministries of defence maintain military hospitals (for example, the US, France, Germany, Spain, Italy, the Czech Republic and Hungary) to ensure access to healthcare for defence patients that meets the requirements of the ministry of defence as an employer (including immediate access to hospital beds for defence patients repatriated from overseas) and also to ensure hospital-based military medical personnel maintain the necessary clinical skills. There is also a requirement for referral services for specialist occupational assessment and investigation of armed forces personnel in aviation medicine, underwater medicine, environmental medicine and other aspects of employment within the armed forces that may not be covered by the civilian public health system. Some states have specialist military medical institutes that combine research and clinical assessment in these fields.¹⁷

However, it is expensive to operate military hospitals and many are only viable if the clinical throughput includes the wider civilian population.¹⁸ In some countries, there is a perception that the overhead costs can be transferred to the public or commercial sector with a resultant saving to the ministry of defence.¹⁹ Furthermore, it may prove difficult to balance the skills needed for military clinicians (high acuity medical and surgical practice associated with major urban centres) with the...
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broadth of family and community medicine needed for the whole defence patient population (including children, mothers and the elderly) in rural military garrisons.20 Thus, the choice between the ministry of defence operating hospitals for defence patients and contracting hospital services from the civilian public or private systems will vary between states and depend on the availability of local services. This choice will be informed by comparisons of clinical services, clinical performance, timeliness of access and the needs of the ministry of defence as an employer (particularly to manage active recovery and recuperation back to work) between options.

The reception of military casualties from military operations into the firm base is a discrete component of the OPCP. This is covered by the definition of a Role 4 Medical Treatment Facility definitive hospital response capability that ‘offers the full spectrum of definitive medical care that cannot be deployed to theatre or will be too time consuming to be conducted in theatre’.21 This requires a hospital that has 24-hour availability of the range of specialist clinical services that can meet the health needs of a severely sick or injured military casualty. There is an additional requirement to also meet the military administration and social needs of the patient’s family who may not be normally resident in the vicinity of the receiving hospital. Some militaries provide specialist social and welfare services (for example, the UK, the US and Germany), including hotel accommodation, as part of this package of care; this may substantially exceed the public provision for civilians in the same circumstances.22

Residential rehabilitation and recovery services are the final component of the Role 4 care pathway for severely injured or sick defence patients. The ministry of defence as an employer has highly demanding medical standards for rehabilitation fitness for military roles which may exceed the expected outcome from civilian rehabilitation and recovery services. This may require these services to be delivered within a military setting that provides an additional benefit of reintroducing the military culture and structure of work as part of the recovery process from injury or illness.23 This residential clinical service will need to cover the defence patient’s physical, mental and social needs, including seamless transition back to these clinical services in garrison healthcare once their need for residential services has ended. While described as a Role 4 clinical service to emphasise the link to the OPCP, residential rehabilitation and recovery is also a key component of rehabilitation referral services from garrison healthcare for defence patients injured or sick during routine military training or from concurrent illness (for example, strokes or after joint replacement).

Citizens’ Healthcare

In some states the healthcare benefits to defence patients continue after military service to the end of their life and so these individuals never return to the public health system. However, even the notion of an endpoint for military service is blurred. Reservists in the UK serve in the armed forces but their entitlement to healthcare varies by employment type and readiness for operational deployment. The status ‘retiree’ occurs at the end of military service and, in some countries, this removes the entitlement to ministry of defence-provided services from the serving member and their family. In principle a retiree has reverted to becoming a citizen and therefore receives ‘citizens’ healthcare’ as part of the usual provision of public healthcare services by the state to its citizens. It also includes access to state support for the wider social determinants of health provided to citizens, such as housing, employment support and welfare provision.

Some countries make additional public services’ provisions for retirees, especially for veterans (those with ill-health conditions that are attributable to military service). For example, in the UK, the Armed Forces Covenant was introduced to mandate ‘no disadvantage’ for veterans who receive services from government departments other than the UK’s Ministry of Defence, and the term ‘veteran’ is applied to anyone who has received one day’s pay for military service.24 This includes ensuring that a patient’s

relative position on waiting lists is maintained if they move between NHS commissioners. Healthcare for veterans is extended by specialist services commissioned to meet their specific needs, such as the mental health Transition, Intervention and Liaison Service, Veterans Mental Health Complex Treatment Services, and prosthetic services. This is complemented by voluntary accreditation schemes such as 'veteran friendly' general practices, and the Veterans Covenant Healthcare Alliance.

Other states provide separate, government-funded health services that differentiate between retirees and veterans. For example, in the US, the Department for Veterans Affairs has a specific mission 'To fulfill President Lincoln’s promise "to care for him who shall have borne the battle, and for his widow, and his orphan" by serving and honoring the men and women who are America’s veterans.' This provision beyond the normal citizens’ entitlement might be considered as 'citizens plus' government support and lies at the interface between the provision of health services for current active duty military personnel and the wider, long-term obligation of government to meet the needs of military personnel after productive uniformed service as part of the overall package of military benefits.

In many countries there is an established role for private insurance schemes of the third sector or charities to provide additional, non-government support to military retirees or veterans. These may directly provide or commission interventions to improve physical, mental and social wellbeing. In the UK, military charities complement the services provided by the government and represent an additional source of support beyond that available to citizens. Some charities provide financial assistance for all members of the armed forces and their families, or to members of each individual service, some provide welfare services, and others provide care for specific disabilities such as blindness, limb loss or mental health problems. There are similar, non-government charities and health maintenance organisations in many other countries such as the US, Nigeria, and Pakistan. Some of these veterans’ organisations are members of the Royal Commonwealth Ex-Services League.

Implications of the Defence Healthcare Cycle

The defence healthcare cycle provides a conceptual explanation of a whole military health system and allows the deconstruction of the individual components for the defence patient. It provides the opportunity to explore the choices for each of these components and is especially useful for comparisons of options between countries and options within a country for different models for delivery. The term

29. For example, the provisions contained in the GI Bill in the US. See US Department of Veterans Affairs, 'About GI Bill Benefits', <https://www.va.gov/education/about-gi-bill-benefits/>, accessed 4 June 2020.
The defence healthcare cycle is a potential model to describe the complete system and allow exploration of choices in organisational and clinical design to meet the organisational and clinical needs of the armed forces.

This defence healthcare cycle describes the inter-relationship between the four components of the healthcare system. It recognises the benefits of integration across clinical services within each component, especially the garrison healthcare component of the firm base. It illustrates the importance of a whole system view for both organisational governance and from the perspective of a patient through their journey between different providers. This is particularly relevant in the design of clinical and management information systems that support the delivery of health services across the defence healthcare cycle. In principle this should be simple as the defence healthcare cycle is under unified oversight of the ministry of defence, but it is complicated by global dispersal of patients and medical facilities, integration with civilian clinical systems, and the different information needs of clinical and administrative users.

There is scope for further analysis of the components of the defence healthcare cycle to the level of precision that has been applied to medical doctrine for the OPCP. Garrison healthcare is the core of the defence healthcare cycle through an individual’s military career. This relationship between the uniformed patient, their commander and military garrison health services that is unified to the common purpose of maximising military performance is at the heart of military medicine. In the UK, the military medical services have had a significant influence on the evolution of general practice, occupational medicine and public health medicine on the basis that the healthcare for military garrisons was already structured as a population-centred clinical service. Internationally, some military medical services are trying to ensure that the status of these community-health practitioners is balanced against the status of hospital-based clinicians. An example is the establishment of a Faculty of Military Medicine by the Irish College of General Practitioners. This article does not fully explore the potential synergies that could be achieved from further integration of primary care, dental health, mental health, musculoskeletal health and occupational health services on a community basis. Further analysis could include concepts for new models of care that distribute the use of healthcare professionals in a way that improves care pathways, fully uses the distinct skills of staff groupings and is more sustainable.

It is likely that there will continue to be pressure across military medical services to demonstrate value and reduce their proportion of costs within the defence budget. Staffing is a very significant operating cost for ministries of defence and healthcare staffing (especially doctors) can be considered expensive. Figure 1 shows the potential overlap (or duplication) for military medical personnel assigned to the firm base and also the OPCP. Designing the best balance between active duty, reserve, mobilised civilian volunteers and civilian personnel to meet the numbers and skill-mix required by the whole defence health cycle is a discrete subject for further analysis. However, it is a further example of where the needs of defence have to be placed within the context of a country’s overall health economy.

In many countries the number, size and scope of military hospitals have been reduced where there is an opportunity for public or commercial providers to take on clinical work that does not require uniformed healthcare practitioners. For example, in Turkey all...
Military hospitals were transferred to its ministry of health in 2016. However, it will continue to be important to define the necessary occupational referral services that the defence patient requires. This will include more than specialist knowledge in the environments of altitude, depth, heat and cold: it will bring in occupational aspects of all body systems such as eyes, ears, skin, circulation, digestion and mental function. Rehabilitation and recovery to a military occupation or a purposeful life as a civilian is also likely to remain an essential output of the defence healthcare cycle. Thus, the input costs of the military medical system need to be balanced against the output value of a maximally fit (physically, mentally and socially) armed force and the contribution of an assured and capable military operational health system to the moral component of fighting power.

Conclusions

As identified at the beginning of this article, many military health systems are undergoing substantial review and change. In many militaries there is a well-established analytical process for the management of military operational capabilities, and this has been applied to medical support on military operations – the OPCP. However, there is scope for the same approach for medical support to be applied to defence patients not on military operations. The defence healthcare cycle is a potential model to describe this complete system and allow exploration of choices in organisational and clinical design to meet the organisational and clinical needs of the armed forces.

The article identifies the critical policy decisions around the definition of the defence patient as a beneficiary of the military health system. It uses the defence healthcare cycle to illustrate the interdependence of the public civilian healthcare system, garrison healthcare, the OPCP and the hospital-oriented definitive healthcare system.

It is likely that the purposes, costs and value of military medical services will come under further scrutiny as defence budgets are reviewed to balance the wider economic costs of the coronavirus pandemic. While the contribution of military medical services to the civil–military government response to this crisis is beyond the scope of this article, it is hoped that the defence healthcare cycle will generate further debates about the development of concepts and medical doctrine for the entirety of military health systems. This can inform strategic choices such as: the balance of costs and obligations between the ministries of defence, health, wider social insurance and charities; the healthcare workforce plan to meet the needs of the armed forces within a state’s health economy; the procurement and integration of medical information systems for the benefit of the defence patient across healthcare providers; and decisions regarding core military medical capabilities that must be retained under military control versus those that can be commissioned or contracted from external providers.

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